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Rev. Jan. 1985
To the Honourable
JACK DAVIS
Minister of Energy, Mines and
Petroleum Resources
Parliament Buildings
Victoria, B.C.

Sir:
I have the honour to submit the Annual Report of
the Ministry of Energy, Mines and Petroleum
Resources for the year 1986.

Yours truly,

R.D. Flitton,
Deputy Minister

The Honourable Robert G. Rogers
Lieutenant-Governor of British Columbia

May It Please Your Honour:

I respectfully submit the Annual Report of the
Ministry of Energy, Mines and Petroleum Resources
for the year 1986.

Jack Davis,
Minister
The energy, mineral and petroleum industries of British Columbia contributed $5 billion to the provincial economy in 1986. Solid mineral production was valued at $2.5 billion, oil and natural gas production was worth another $661 million, and the B.C. Hydro and Power Authority reported revenue of $1.9 billion with $45 million of it earned by electricity exports to the United States.

It is the responsibility of the Ministry of Energy, Mines and Petroleum Resources to ensure the orderly development of our valuable resources. At the same time, the Ministry also protects the environment, applies safety standards, collects revenue, formulates policies and advises government. The Minister is directly responsible for three Crown agencies operating in the energy sector: B.C. Hydro, the B.C. Petroleum Corporation and the B.C. Utilities Commission.

Under the Ministry’s stewardship, our mining and petroleum industries are consistently the greatest source of direct resource income for the provincial government. In 1986, that revenue amounted to $225 million.

Administering the province’s mineral and energy resources and regulating a complex industry is a big responsibility carried out by a comparatively small Ministry – 306 full-time staff or the equivalent. The Ministry is headquartered in Victoria but maintains district operations at nine other locations around the province: Fernie, Fort St. John, Kamloops, Nanaimo, Nelson, Prince George, Quesnel, Smithers and Vancouver.

This report covers the highlights of Ministry operations and provides brief accounts of industry status and energy trends for the calendar year 1986. More detailed information and statistics are provided in a number of other Ministry publications available from:

Ministry of Energy, Mines and Petroleum Resources
Publications Distribution
Parliament Buildings
Victoria, B.C. V8V 1X4
Telephone (604) 387-3188
THE ENERGY RESOURCES DIVISION advises on policies and programs designed to develop British Columbia's energy resources in such a way that they:

* encourage economic development
* maintain environmental integrity
* balance current demands against future needs
* achieve energy security and, in the long run, energy self-sufficiency for the province.

POLICY DEVELOPMENT BRANCH
Develops and recommends short- and long-term energy policy strategies.

PROJECT ANALYSIS BRANCH
Co-ordinates reviews of proposals for the development, use and removal of B.C. energy resources, ensuring that such projects are in the public interest.

FORECASTS AND SPECIAL PROJECTS BRANCH
Prepares annual forecasts on energy supply and demand in the province and undertakes special studies on energy projects.
The Energy Sector in 1986

In 1986, provincial energy requirements decreased by an estimated four per cent. This was caused primarily by a mild winter and a forest industry labour dispute.

All sectors except transportation experienced a decline in energy requirements. Industrial sector requirements declined by five per cent, commercial by five per cent and residential by eight per cent. The decline in residential and commercial requirements reflects the sensitivity of their energy demand to changes in the weather. Transportation requirements increased marginally.

Provincial natural gas demand decreased by eleven per cent whereas exports to U.S. markets increased by eight per cent. Short term direct sales to U.S. markets were up by 83 per cent, more than offsetting a poor year of long term "system" gas sales.

Electricity requirements declined in both domestic and export markets. In the domestic market the decline was four per cent. However, exports to the Pacific Northwest plummeted from 10.7 billion kilowatt hours in 1985, to 2.1 billion kilowatt hours in 1986. Between April and July, there were no electricity exports.

The province's oil requirements increased marginally in 1986. Only 27 per cent of requirements were supplied from within the province; the deficit was made up through purchases of crude oil and refined products from Alberta.
## British Columbia End Use Consumption by Energy Type and by Sector, 1985 and 1986 Petajoules (PJ)*

<table>
<thead>
<tr>
<th>Refined Petroleum Products</th>
<th>Natural Gas</th>
<th>Electricity</th>
<th>Propane</th>
<th>Hog Fuel and Pulping Liquor</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Gasoline</td>
<td>LFO</td>
<td>Diesel</td>
<td>HFO</td>
<td>Aviation Fuel</td>
<td></td>
</tr>
<tr>
<td><strong>1985 (Actual)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road and Urban Transport</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>116</td>
<td>21</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>140</td>
</tr>
<tr>
<td>Marine</td>
<td>-</td>
<td>9</td>
<td>4</td>
<td>-</td>
<td>13</td>
</tr>
<tr>
<td>Airlines</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>17</td>
</tr>
<tr>
<td>Railways</td>
<td>-</td>
<td>11</td>
<td>-</td>
<td>-</td>
<td>17</td>
</tr>
<tr>
<td>Total Transportation</td>
<td>116</td>
<td>41</td>
<td>4</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>Industrial</td>
<td>-</td>
<td>28</td>
<td>19</td>
<td>-</td>
<td>428</td>
</tr>
<tr>
<td>Residential***</td>
<td>64</td>
<td>41</td>
<td>3</td>
<td>-</td>
<td>125</td>
</tr>
<tr>
<td>Commercial and Other Institutional</td>
<td>74</td>
<td>14</td>
<td>2</td>
<td>2</td>
<td>98</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>86</td>
<td>25</td>
<td>19</td>
<td>832****</td>
</tr>
</tbody>
</table>

| **1986 (Estimate)** | | | | | |
| Road and Urban Transport | 116 | 19 | - | - | 139 |
| Marine | - | 9 | 5 | - | 14 |
| Airlines | - | - | - | - | 19 |
| Railways | - | 10 | - | - | 10 |
| Total Transportation | 116 | 38 | 5 | 19 | 182 |
| Industrial | - | 26 | 21 | - | 194 |
| Residential*** | 57 | 39 | 3 | - | 115 |
| Commercial and Other Institutional | 74 | 13 | 2 | 2 | 93 |
| Total | 125 | 80 | 28 | 21 | 797**** |

* A petajoule is a standard metric unit of energy equivalent to 25,426 cubic metres of oil, 27 million cubic metres of natural gas or 280 gigawatt hours of electricity.

** Less than 1 petajoule.

*** Includes apartments and agriculture.

**** Rows or columns may not add to totals because of rounding.

Highlights

Energy policy initiatives in 1986 focussed on deregulation of natural gas markets and prices. In the electricity sector, studies were initiated on electricity deregulation.

The Agreement on Natural Gas Markets and Prices, signed by Canada and the gas-producing provinces in October 1985, provided for a 12-month transition period from government administered pricing to a market sensitive price regime in both the domestic and export natural gas markets.

Activities leading up to the target deregulation date of November 1, 1986, were designed to provide for both lower prices for consumers and improved market access for producers. The wholesale price of gas to the distribution utilities, which had customarily been determined by Cabinet, was negotiated between the utilities and the supplier (the British Columbia Petroleum Corporation) with a significant drop in price level. Many large industrial gas consumers have negotiated supply contracts directly with producers and have made the necessary transportation arrangements with Westcoast Transmission and the distributors.

The price criteria for export gas have been modified and a review of provincial surplus determination procedures has begun in order to make them consistent with market pricing objectives.

Three new agreements were signed under the Electricity Rate Discount Act bringing the total to eleven. These agreements enable industries to increase or maintain production that otherwise would not be profitable. The program has generated an additional $33.5 million in revenue for B.C. Hydro and $12.4 million for the province while creating an additional 560 jobs.

Since 1980, British Columbia has legislated responsibility and developed capability for managing energy resources, including the granting of certificates for the removal of energy resources from the province.

The province's procedures protect present and future domestic energy requirements and ensure that energy export prices are in the public interest.
In the fall of 1986, the National Energy Board held an Inquiry into the Regulation of Electricity Exports with an objective of reducing regulatory overlap. The Ministry made a submission to the Inquiry proposing that the National Energy Board accept the province's decisions with respect to surplus determination, pricing, licence term and other issues as sufficient evidence that the Board's requirements for energy export licences have been met.

In November, 1986, Cabinet established specific priorities for each Ministry for the coming year. In accordance with these instructions, the Energy Resources Division began detailed studies on four projects:

1. Electricity exports to the United States;
2. Additional electrical generation capacity;
3. Electricity cost discounts in specific regions;
4. Energy to Vancouver Island for economic development.

These studies were continuing at year end.
MINERAL RESOURCES DIVISION

THE MINERAL RESOURCES DIVISION oversees the operation of British Columbia's mining industry and facilitates the orderly development of mineral, coal and aggregate resources in the province.

ASSISTANT DEPUTY MINISTER

ENGINEERING AND INSPECTION BRANCH
Ensures worker and public safety, mine reclamation, and maximum economic extraction of mineral and coal resources based on sound engineering practices, using a network of district offices and specialists.
* Geotechnical Section
* Mechanical/Electrical Section
* Reclamation Section
* Mines Rescue and First Aid Section
* Environmental Control Section
* Mining and Petroleum Roads Section

GEOLOGICAL SURVEY BRANCH
Carries out geological studies and provides the mineral industry with geological data.
* Mineral Deposits and Regional Mapping Section
* District Geology and Coal Resources Section
* Resource Data and Analysis Section
* Analytical Sciences Section

MINERAL TITLES BRANCH
Administers laws and regulations pertaining to the acquisition and maintenance of mineral tenures, using gold commissioners and sub-recorders in 24 mining divisions in the province.

MINERAL POLICY AND EVALUATION BRANCH
Value of Mineral Production 1982-86 ($ million)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Metals</td>
<td>1,057.5</td>
<td>1,106.0</td>
<td>1,036.9</td>
<td>1,006.8</td>
<td>1,131.4</td>
</tr>
<tr>
<td>Industrial Minerals</td>
<td>95.6</td>
<td>89.5</td>
<td>114.7</td>
<td>111.0</td>
<td>132.6</td>
</tr>
<tr>
<td>Structural Materials</td>
<td>164.2</td>
<td>208.4</td>
<td>200.1</td>
<td>232.8</td>
<td>234.6</td>
</tr>
<tr>
<td>Coal</td>
<td>566.9</td>
<td>555.8</td>
<td>1,007.5</td>
<td>1,028.3</td>
<td>1,000.2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,884.2</td>
<td>1,959.7</td>
<td>2,359.2</td>
<td>2,378.9</td>
<td>2,498.8</td>
</tr>
</tbody>
</table>

*Estimate

The Mining Industry in 1986

World mineral markets produced a mixed showing during 1986, reinforcing an emerging pattern of structural change in the British Columbia mining industry. Some segments of the industry are facing difficult adjustments and limited growth prospects, while others are taking advantage of new opportunities in the precious metals field and expanding from new technologies for advanced materials.

The total value of minerals produced in British Columbia increased nominally over the previous year to $2.5 billion. Production volumes of most minerals remained the same or increased slightly, an indication that the province’s mineral producers are managing to hold onto their share of highly competitive markets.

Coal continued to be the province’s most important mineral commodity, despite a slight reduction in both value and volume of production during 1986. British Columbia producers faced hard negotiations on their contracts with traditional Japanese buyers, resulting in further price and volume cutbacks. In view of the downturn in some overseas markets, the coal industry has been seeking to develop new domestic markets, both in the local cement and pulp industries and in eastern Canada. On Vancouver Island, the Quinsam mine opened and began limited production of thermal coal for sale to local pulp mills. Generally, thermal coal markets have remained firm both at home and abroad, with coal maintaining its energy supply share in spite of falling world oil prices.

Further rationalization of the copper industry in British Columbia was seen in 1986. Increased productivity was the objective of several developments, such as the creation of Highland Valley Copper from Lornex and Cominco assets in the Highland Valley. Gibraltar Mines, located near Williams Lake, commenced construction of a 5,000 tonne/year heap-leaching plant at the mine, facilitated by a British Columbia Hydro electricity rate discount. The province’s Commissioner of Critical Industries negotiated a package of initiatives which enabled the Similkameen mine near Princeton to remain in operation. As a result of these three developments, both the value and volume of copper produced in British Columbia increased slightly despite weak prices on over-supplied world markets.

1986 was the first full year of production from the Brenda copper-molybdenum mine, following its reopening in mid-1985 with the assistance of the Commissioner of Critical Industries. As a result, provincial molybdenum production rose substantially. Also contributing to the increase was the reopening of the Endako primary molybdenum mine, aided by a British Columbia Hydro electricity rate discount.

Lead production in British Columbia dropped 12 per cent, largely due to reduced production from Cominco’s Sullivan mine. In contrast, zinc production climbed nearly 30 per cent owing to Westmin’s successful Buttle Lake expansion.

Although asbestos markets remained depressed, Cassiar Mining Corporation undertook detailed exploration and preliminary feasibility work on the McAdam ore body, with the intention of replacing their present open pit operation with an underground mine.

The prime object of exploration and development interest in the province during 1986 was gold. With prices showing a strong upward trend, several properties showed promise as potential mines, primarily in the Toadgogone and the Stewart areas. Construction of the Blackdome mine near Clinton was completed and the mine commenced operations in May. The Nickel Plate mine near Hedley started construction in mid-1986. Several other precious metal projects are nearing production decisions.
Mineral Production of British Columbia, 1985 and 1986

<table>
<thead>
<tr>
<th></th>
<th>1985 Actual</th>
<th>1986 Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>QUANTITY</td>
<td>$ VALUE</td>
</tr>
<tr>
<td><strong>METALS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper</td>
<td>301,648,642</td>
<td>579,674,070</td>
</tr>
<tr>
<td>Gold</td>
<td>6,768,676</td>
<td>94,497,832</td>
</tr>
<tr>
<td>Iron Concentrates</td>
<td>87,571</td>
<td>3,819,609</td>
</tr>
<tr>
<td>Lead</td>
<td>116,811,328</td>
<td>42,337,760</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>7,525,784</td>
<td>72,467,300</td>
</tr>
<tr>
<td>Silver</td>
<td>348,445,259</td>
<td>93,015,692</td>
</tr>
<tr>
<td>Zinc</td>
<td>108,072,664</td>
<td>112,725,885</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td>8,226,370</td>
</tr>
<tr>
<td><strong>Total Metals</strong></td>
<td></td>
<td>1,006,764,517</td>
</tr>
<tr>
<td><strong>INDUSTRIAL MINERALS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asbestos</td>
<td>89,350</td>
<td>56,715,028</td>
</tr>
<tr>
<td>Sulphur</td>
<td>500,979</td>
<td>42,907,957</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td>11,393,035</td>
</tr>
<tr>
<td><strong>Total Industrial Minerals</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>111,016,020</td>
</tr>
<tr>
<td><strong>STRUCTURAL MATERIALS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cement</td>
<td>988,498</td>
<td>74,531,197</td>
</tr>
<tr>
<td>Sand and Gravel</td>
<td>49,007,121</td>
<td>117,014,859</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td>41,278,736</td>
</tr>
<tr>
<td><strong>Total Structural Materials</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>232,824,792</td>
</tr>
<tr>
<td>COAL</td>
<td>22,552,599</td>
<td>1,028,317,201</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>2,359,187,279</td>
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</table>

Provincial Revenue from the Mining Industry

<table>
<thead>
<tr>
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<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Claims</td>
<td>3,541,482</td>
<td>4,202,796</td>
<td>4,125,943</td>
<td>3,984,549</td>
<td>3,744,961</td>
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<tr>
<td>Coal licences</td>
<td>2,954,387</td>
<td>2,704,183</td>
<td>2,816,777</td>
<td>2,630,730</td>
<td>2,390,979</td>
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<tr>
<td>Coal royalties</td>
<td>7,097,772</td>
<td>7,839,588</td>
<td>18,709,029</td>
<td>22,856,113</td>
<td>24,990,229</td>
</tr>
<tr>
<td>Mineral land</td>
<td>13,989,511</td>
<td>14,570,271</td>
<td>16,817,588</td>
<td>19,088,336</td>
<td>14,279,477</td>
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<tr>
<td>Mineral resource</td>
<td>1,136,895</td>
<td>(1,522,314)*</td>
<td>7,372,346</td>
<td>1,357,896</td>
<td>6,839,253</td>
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<tr>
<td>Mining taxes</td>
<td>6,378,279</td>
<td>910,831</td>
<td>2,297,638</td>
<td>3,742,405</td>
<td>515,624</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td>35,098,371</td>
<td>28,705,355</td>
<td>52,139,321</td>
<td>53,660,028</td>
<td>52,760,523</td>
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</tbody>
</table>

**NOTE:** Excludes rentals and royalties on industrial minerals and structural materials.

*Rebate for overpayment from previous year.*
DESTINATION OF COAL SHIPPED FROM B.C., 1985 (TONNES)

CANADA 957,194 (4.3%)
TOTAL FOREIGN
OTAL SALES 21,092,588 TONNES

OTHERS 2,220,437 (10.1%)
BRAZIL 515,719 (2.3%)
TAIWAN 496,297 (2.3%)
FRANCE 457,749 (2.1%)
KOREA 2,736,037 (12.6%)

Complete 1986 figures not available.

DESTINATION OF METALS IN ORES AND CONCENTRATES SHIPPED FROM B.C. MINES, 1985

CANADA $220,256,595 (22.1%)
TOTAL FOREIGN
TOTAL SALES $997,250,594

JAPAN 564,603,264 (56.6%)
GERMANY $12,297,366 (1.2%)
CHINA $15,288,284 (1.5%)
KOREA $11,566,349 (1.2%)
OTHER $102,551,391 (10.3%)
EUROPE $13,720,207 (1.4%)
TAIWAN $56,967,138 (5.7%)

Complete 1986 figures not available.

EMPLOYMENT IN THE MINERAL INDUSTRY IN B.C. TO 1985

<table>
<thead>
<tr>
<th>Year</th>
<th>Metals</th>
<th>Coal</th>
<th>Structural Materials</th>
<th>Industrial Minerals</th>
<th>Exploration &amp; Development</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>12,583</td>
<td>4,652</td>
<td>573</td>
<td>554</td>
<td>6,651</td>
<td>25,013</td>
</tr>
<tr>
<td>1983</td>
<td>10,416</td>
<td>4,298</td>
<td>511</td>
<td>554</td>
<td>3,720</td>
<td>19,499</td>
</tr>
<tr>
<td>1984</td>
<td>9,208</td>
<td>5,781</td>
<td>492</td>
<td>437</td>
<td>4,789</td>
<td>20,707</td>
</tr>
<tr>
<td>1985</td>
<td>8,102</td>
<td>5,821</td>
<td>817</td>
<td>410</td>
<td>4,262</td>
<td>19,412</td>
</tr>
</tbody>
</table>

Complete 1986 figures not available.
Major Mines and Selected Potential Mines in British Columbia, 1986

PRODUCING MINES

1. Afton (Cu, Au, Ag)
2. Eton Mountain (Magnesite)
3. Bell (Cu, Cu, Ag)
4. Blackdome (Au, Ag)
5. Highland Valley Copper (formerly Valley Copper and Lomex)
   (Cu, Mo)
6. Brenda (Cu, Mo)
7. Cassiar (Asbestos)
8. Endako (Mo)
9. Equity (Ag, Au, Cu)
10. Erickson (Au, Ag)
11. Gibraltar (Cu, Mo)

*12. Goldstream (Cu, Zn, Ag)
*13. Good Hope-Horn Silver (Ag, Pb, Zn, Au)
*14. Cranisle (Cu)
15. Beaverdell (Ag, Pb, Zn)
*16. Highmany (Cu, Mo)
17. Island Copper (Cu, Mo, Au)
18. Kamloops (Limestone)
*19. Kitsault (Mo)
20. Lussier River (Gypsum)
21. Myra Falls (Zn, Pb, Cu, Ag, Au)
22. Mosquito Creek (Au)
*23. Parsons (Barite)
24. Pavilion Lake (Limestone)
*25. Scottie (Au)
26. Silver (Ag, Pb, Zn)
27. Similkameen (Cu, Au)
28. Spilliamh (Barite)
29. Sullivan (Zn, Zn, Ag, Cd, Sn)
30. Sunnys Mountain (Clay)

31. Taurus (Au, Ag)
32. Texada Island (Limestone)
33. Tillicum Mountain (Au, Ag, Pb, Zn)
34. Westrock (formerly Western Gypsum) (Gypsum)
35. Golden (Silica)
36. Nicholson (Silica)
37. Dahi Lake (Limestone)
38. Red Lake (Fuller's Earth)
39. Benson Lake (Limestone)
40. Lost Creek (Limestone)
41. Rock Creek (Dolomite)
42. Crawford Bay (Dolomite)

POTENTIAL MINES

43. Al (Au)
44. Bralorne (Au, Ag)
45. Circine (Pb, Zn)
46. Freegold/Dome Mountain (Au)
47. Golden Bear (Au, Ag)
48. Kutcho Creek (Cu, Zn, Ag)
49. Lara (Au, Ag)
50. Lawyers (Au, Ag)
51. Midway (Ag, Pb, Zn)
52. Nickel Plate (Au)
53. O'Conner River (Gypsum)
54. OR (Au, Cu)
55. Rea Gold (Au, Ag, Zn, Pb, Cu)
56. Johnny Mountain (Au)
57. Silbak Premier (Au, Ag)
58. Sulphur (Au, Ag)
59. Windy-Craggy (Cu, Co)
60. Yellow Giant (Au, Ag)

PRODUCING COAL MINES

61. Bullmoose
62. Byron Creek
63. Foding
64. Greenhills
65. Balmer
66. Lime Creek
67. Quinsam
68. Quinte
69. Wolf Mountain

POTENTIAL COAL MINES

70. Burnt River
71. Chute Creek
72. Mount Klapan
73. Telkwa

*Did not operate in 1986.
The highlight of 1986 was the introduction of the $5 million Financial Assistance for Mineral Exploration (FAME) program. Designed to promote exploration activities, FAME provided funds for 155 exploration programs including grass-roots prospecting, properties with identified mineral potential, and exploration to extend reserve life at existing mines. Results indicate that this program will prove highly successful in helping discover and delineate new ore bodies, leading to either new mine developments or increased reserves at existing mines. In the fall, Premier Vander Zalm and Mines Minister Davis requested that the mining industry establish a high-level task force to advise government on ways and means to revitalize the industry and stimulate its long term growth and development. The report is expected to help set the agenda for future mineral policy development in the province.

In December, following issuance of the report of the "Task Force on Expanded Use in Ontario of Low Sulphur Western Coal", the Division appointed a coal coordinator to promote increased British Columbia coal sales to Ontario by the 1990's. Also in December, the Minister announced that the seven year moratorium on uranium exploration and mining would be replaced by stringent new regulations when the moratorium lapses in early 1987.

1986 was the first full year of the five-year, $10 million Mineral Development Agreement, a subsidiary agreement to the Canada-British Columbia Economic and Regional Development Agreement. The M.D.A., initiated in mid-1985, has had a significant impact on the province's mineral industry, primarily in the upgrading of British Columbia's geological data base through regional mapping, geochemistry projects and metallogenic, coal and industrial mineral studies. The Mineral Opportunities Program of the M.D.A. provided funds for several market, technical and feasibility studies cost-shared with the private sector.

During the year a number of proposed projects moved closer to a production decision. Nine proposed coal and gold mine developments or expansions were approved for permitting through the Mine Development Review Process, designed to expedite the development of sound, publicly acceptable mine developments. Work continued on environmental and engineering road design studies for two major mine proposals, Gulf Canada Resources Ltd.'s Mt. Klappan Anthracite project and Cheni Gold Mines Inc.'s Lawyers project (jointly funded by the companies and the M.D.A.).

The Geological Survey Branch, with M.D.A. assistance, increased its program of geological and geochemical field surveys significantly over 1985 levels. Systematic geological mapping programs were initiated in areas of high metallic and industrial mineral potential and the scope of detailed mineral deposit studies was increased. Regional geochemical surveys and database development remained a high priority. A record number of Branch publications were released in 1986. These were well received by industry and continue to play an important role in stimulating mineral exploration activity by the private sector. Public access to databanks maintained by the Geological Survey Branch has been significantly enhanced by making them available on microcomputer diskettes.

The Engineering and Inspection Branch completed a restructuring of its operations in 1986 with organizational changes designed to provide for more efficient and consistent delivery of Branch programs. The major review of the Mines Act and its Regulations initiated in 1985 was continued during 1986. The Branch once again organized several mine rescue competitions at various locations throughout the province, as well as the National Mine Rescue competition in Nanaimo with competing teams representing five provinces and two territories. The Branch co-sponsored symposia on rock drains, reclamation, and industrial hygiene in addition to studies of very high waste dump stability and acid mine drainage.

The Mineral Titles Branch carried out extensive consultations with industry on amendments to the Mineral and Mining (Placer) Acts.

Further progress toward more efficient record keeping was achieved with the aid of computers. This included issuance of 60 computerized claim maps of the most congested staking areas in the Victoria and Similkameen mining divisions.
THE PETROLEUM RESOURCES DIVISION is responsible for the administration of Crown-owned petroleum and natural gas in British Columbia and for the regulation of drilling and production operations on land and in provincial offshore areas.

MEDIATION & ARBITRATION BOARD
Facilitates negotiations between petroleum operators and landowners for access to petroleum-bearing lands.

ASSISTANT DEPUTY MINISTER

OFFSHORE PETROLEUM COORDINATOR
Assists in preparation for west coast offshore exploration.

ENGINEERING AND OPERATIONS BRANCH
Regulates field operations to assure safety, protection of the environment and resource conservation. Provides resource analyses, oil and gas reserves data and statistical reports, and assessments of provincial policies and requirements.
* Development Section
* Reservoir Engineering Section
* Field Operations — District Office, Charlie Lake, Fort St. John

PETROLEUM GEOLOGY BRANCH
Carries out geological studies and provides information to the petroleum industry.
* Economic Geology Section
* Geophysical Section
* Reservoir Geology Section

PETROLEUM TITLES BRANCH
Administers title to Crown-owned subsurface oil and natural gas, and provides rights through a competitive bidding process. Approves geophysical operations and assures good practice.
* Lease Administration Section
* Revenue Section
* Drafting Section
The Petroleum Industry in 1986

The petroleum industry in Western Canada felt the pronounced impact of the drop in world oil prices which affected all petroleum producing areas. In British Columbia, seismic exploration and exploration drilling reflected the restricted market outlook with a 40 per cent drop in activity.

A total of 161 wells were drilled in 1986, a decrease of 32 per cent from the previous year. There were 47 completed as oilwells, 35 for natural gas, and 24 at year end yet to be completed. Most of these were in the Fort St. John area and will be completed as oilwells.

Exploration for oil and gas in British Columbia continued into sedimentary basins outside of the Northeastern sector of the province, which has been the only petroleum producing area to date.

Two wells were drilled and abandoned on Vancouver Island. Additional drilling took place on Vancouver Island to evaluate the potential for extracting methane in commercial quantities from coal seams.

Three wells were also drilled in Southeastern British Columbia. At year end, one well was drilling south of Cranbrook in an area not previously tested for hydrocarbons, and a well authorization had been requested for a well near the town of Sparwood. The possibility of sour gas being found in these wells has brought to community attention the issues involved in sour gas exploration and development.

<table>
<thead>
<tr>
<th>Value of Hydrocarbon Production ($ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Crude oil</td>
</tr>
<tr>
<td>Field condensate</td>
</tr>
<tr>
<td>Natural gas</td>
</tr>
<tr>
<td>Gas plant liquids</td>
</tr>
<tr>
<td>Totals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Provinicial Revenue from the Petroleum Industry ($ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Rentals &amp; fees</td>
</tr>
<tr>
<td>Crown reserve disposments</td>
</tr>
<tr>
<td>Royalties (oil and products)</td>
</tr>
<tr>
<td>Natural gas royalties (or equivalent)</td>
</tr>
<tr>
<td>Totals</td>
</tr>
</tbody>
</table>

Production of oil and natural gas remained steady despite the drop in drilling operations. Oil production increased by three per cent while natural gas volumes delivered declined by nine per cent.

The petroleum industry remained at the forefront of resource sectors in its importance to the economy of British Columbia, although petroleum revenues were sharply down from the previous year. Returns from the disposition of Crown rights were $29 million, a 67 per cent drop. Fees and rentals on Crown rights declined 15 per cent, while royalties collected on oil and natural gas production declined 40 per cent and 27 per cent respectively.
Highlights of 1986 Petroleum Activities

- Inland Marine Zone
- Panel report for Offshore Petroleum Exploration
- BP Exploration
- Kootenay Bay Exploration
- Natural Gas Exploration and Development
- Infill Drilling
- Canadian Hunter Deep Basin Exploration
- Shell Canada Exploration
- Chevron Exploration
- P & NC and Underground Storage Rights to be Posted

PIPLINES
- Oil
- Gas
Highlights

The activities of the Petroleum Resources Division reflected the requirements to support a maturing resource sector in British Columbia.

To improve service to petroleum companies and to bring increased efficiency to its own operations, the Division has had underway a phased program to computerize data handling. In 1986 emphasis was placed on developing a new system for handling production records and for reserves reporting. Data tapes are available to petroleum operators.

The natural gas marketing system, which provides an explicit royalty for natural gas, came into effect in 1985. This set the stage for an on-going effort to assist deregulation and provide greater flexibility in natural gas marketing. Reviews of well and field economics, the impact of adjustments to the established royalty system, and an analysis of producer cost of service allocations were typical projects to support the intent of the provincial government to create a favourable climate for investment in natural gas development. A review of reserves and natural gas productibility and an outlook on gas yet to be discovered show favourable prospects for exploration in British Columbia, and a clear need for active drilling to prove up new reserves to meet markets as they develop.

The extent of the occurrence of sour gas in British Columbia, two-thirds of existing wells having significant hydrogen sulphide, and the potential for hazardous situations in sour gas operations led to a review of "special well" requirements for operations in areas of risk. Emergency response plan guidelines and internal procedures were under review for wells and associated facilities.

Views were solicited from the petroleum industry on terms to be applied to the disposition of exploration rights, including rights to underground storage of natural gas in the Fraser Valley. A number of companies stated their interest, and will be consulted further before rights are posted for sale.

The environmental review for West Coast offshore exploration was completed early in 1986.

Recommendations from the Offshore Exploration Environmental Assessment Panel were submitted jointly to the federal and provincial governments for a review on how they could best be implemented. A geological assessment by Division staff shows encouraging prospects for finding oil and natural gas in West Coast offshore basins.

The disposition of Crown petroleum and natural gas rights was assisted by increasing the number of sale dates from five in previous years to eight in 1986. Average prices paid to acquire acreage declined, but British Columbia maintained sales at a favourable level when compared to other producing provinces.

The Mediation and Arbitration Board carried out its usual duties, primarily in the northeastern sector of the province, including wellsite inspections, issuing Right-of-Entries for new well locations, mediating hearings and settling cases by arbitration. The Board also opened a suboffice in Nanaimo during the latter half of the year to deal with enquiries from Vancouver Island landowners who felt they might be entitled to mineral rights underlying land in an area where BP Resources drilled two exploratory wells.
FINANCE AND ADMINISTRATION DIVISION

THE FINANCE AND ADMINISTRATION DIVISION provides support for the Ministry’s operations and programs, and manages the assessment and collection of taxes and royalties from the mineral and petroleum industries.

FINANCE AND RESOURCE REVENUE BRANCH
Provides financial administration for all sections of the Ministry. Administrates taxes and royalties assessed under the Mineral Resources Tax Act, Mineral Land Tax Act, Coal Royalty Regulations, Petroleum and Natural Gas Royalty Regulations.

ADMINISTRATION BRANCH
Manages office space, field equipment, vehicles, telecommunications, assets, purchasing, mail and courier services for the Ministry. The Branch also distributes Ministry maps and publications.

DATA SERVICES BRANCH
Plans and manages data processing operations, including automation of Mineral Titles and Petroleum Titles systems.

PERSONNEL SERVICES BRANCH
Provides services for staff recruitment and selection, employee relations, job classifications, staff training and development, and safety programs.
Highlights

Revenue collections by the Ministry in 1986/87 are estimated to have declined by 32 per cent to $224.6 million from $331.0 million collected in 1985/86. The principal reason for this decline was the continued low world oil price which caused a fall in the export price of natural gas reflected in substantially lower petroleum and natural gas royalties. Drilling rights and bonus bid revenues also fell — from $88 million to $61 million — as industry cut back exploration programs in response to severely reduced cash flows.

In 1986, the Division completed a strategic plan for the Ministry's information systems including selecting the Digital Equipment Corporation line of VAX computers for all database, CAD/CAM and scientific computing, and confirming the use of AES Data Ltd. wordprocessors in the Ministry's office automation program.

Several new information systems were completed during the year, and $400,000 worth of new equipment was installed in Victoria and the District Offices.

During the year, plans for the expansion of the drilling core storage facility at Charlie Lake were completed. This project will add ten years of storage capacity for petroleum core samples and double the area available to industry for examination of drill cores.

Plans for the consolidation of Ministry headquarters offices at 617 Government Street were also continued. The Division also introduced a new Asset Control Procedures Manual and further enhanced the Ministry's radio-telecommunications equipment.

Staff training programs continued to focus on key Ministry needs, such as computer and financial training and professional development, while the Women's Program continued to provide a focal point for intra-Ministry discussion of women's issues as they arose. A series of lunch hour programs featuring guest speakers, films, etc., gave women in the Ministry an increased awareness of issues affecting women at work and the resources available for solving specific problems. In conjunction with other resource ministries, a Career Information Day was held.
Ministry of Energy, Mines and Petroleum Resources
Details of Expenditures by Appropriations and Activities, and
by Standard Expenditure Classification
For the Fiscal Years 1985/86 and 1986/87
(These two fiscal years bracket the 1986 calendar year.)

<table>
<thead>
<tr>
<th>Summary of Expenditures</th>
<th>FISCAL YEAR 1985/86</th>
<th>FISCAL YEAR 1986/87 (Est.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minister’s Office</td>
<td>182,186</td>
<td>197,000</td>
</tr>
<tr>
<td>Resource Management Program (net of recoveries)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executive Management</td>
<td>736,539</td>
<td>770,000</td>
</tr>
<tr>
<td>Finance and Administration Division</td>
<td>2,581,606</td>
<td>3,050,000</td>
</tr>
<tr>
<td>Energy Resources Division</td>
<td>2,924,901</td>
<td>5,600,000</td>
</tr>
<tr>
<td>Mineral Resources Division</td>
<td>8,892,943</td>
<td>10,000,000</td>
</tr>
<tr>
<td>Petroleum Resources Division (Note 1)</td>
<td>4,918,693</td>
<td>4,000,000</td>
</tr>
<tr>
<td>Fort Nelson Indian Band Revenue Sharing Agreement Statutory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial Administration Act Sec. 24 (c) — Interest on Revenue Refunds</td>
<td>743,627</td>
<td>650,000</td>
</tr>
<tr>
<td>Financial Administration Act Sec. 14 — Write offs (Note 2)</td>
<td>26,250</td>
<td>0</td>
</tr>
<tr>
<td>Financial Administration Act Sec. 22 — Mount Klappan Planning Studies (note 3)</td>
<td>52,500</td>
<td>390,000</td>
</tr>
<tr>
<td>Mines Act Sec. 15 (2) — Mine Improvement</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mineral Development Agreement (Net of Recoveries)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mineral Exploration Incentives Program</td>
<td>823,219</td>
<td>1,253,000</td>
</tr>
<tr>
<td>Financing Transaction — NORP Program (Net of Recoveries) (Note 4)</td>
<td>0</td>
<td>5,000,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>21,899,168</td>
<td>30,935,000</td>
</tr>
<tr>
<td>Standard Expenditure Classification</td>
<td>FISCAL YEAR 1985/86</td>
<td>FISCAL YEAR 1986/87 (Est.)</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>---------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Salaries</td>
<td>11,455,019</td>
<td>11,550,000</td>
</tr>
<tr>
<td>Supplies and Services</td>
<td>6,038,719</td>
<td>7,825,000</td>
</tr>
<tr>
<td>Capital (Note 1)</td>
<td>2,458,661</td>
<td>1,990,000</td>
</tr>
<tr>
<td>Other Expenditure (NORP Program, Write Offs and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mount Klappan Project)</td>
<td>9,248,825</td>
<td>1,487,000</td>
</tr>
<tr>
<td>Grants (Includes Fort Nelson Revenue Sharing Agreement)</td>
<td>1,894,268</td>
<td>9,180,000</td>
</tr>
<tr>
<td>Recoveries (NORP Program, Mineral Development Agreement and Mount Klappan Project)</td>
<td>(9,196,324)</td>
<td>(1,097,000)</td>
</tr>
<tr>
<td>Total</td>
<td>21,899,168</td>
<td>30,935,000</td>
</tr>
</tbody>
</table>

Notes

1. Amount includes $1,500,000 in Fiscal 1985/86 for capital construction of a petroleum resource road to Desan Lake.
2. Uncollectable accounts receivable.
3. Mount Klappan Planning Studies costing $82,625 in Fiscal 1985/86 were fully recovered from the study participants.
4. Payments to producers under the Federal government's New Oil Reference Price (NORP) program totalling $9,072,248 were fully recovered. This program was discontinued on July 1, 1985, by the Western Accord.
MINISTRY TELEPHONE DIRECTORY

DEPUTY MINISTER’S OFFICE

Executive Coordinator ................................................. 387-5137
Communications Branch
  General Inquiries ................................................. 387-5178
  Library .......................................................... 387-6407
  Publications Production ......................................... 387-5631

ENERGY RESOURCES DIVISION

Assistant Deputy Minister .......................... 387-1916
Policy Development Branch ......................... 387-5231
Project Analysis Branch .............................. 387-5231
Forecasts and Special Projects Branch ........ 387-5231

MINERAL RESOURCES DIVISION

Assistant Deputy Minister .......................... 387-6242
Mineral Titles Branch ................................. 387-4417
Engineering & Inspection Branch ............. 387-3781
Geological Survey Branch ......................... 356-2818
  Chief Geologist ........................................ 387-0688
  Resource Data and Analysis ....................... 356-2818
  Mineral Deposits and Regional Mapping .... 356-2818
  Drafting .................................................. 387-5975
  District Geology and Coal Resources ....... 356-2834
  Lapidary ................................................... 387-6758
  Analytical Sciences ..................................... 387-6249

Nanaimo ......................................................... 755-2486

PETROLEUM RESOURCES DIVISION

Assistant Deputy Minister ...................... 387-3485
  Engineering & Operations Branch ........ 387-5993
  Reservoir Engineering ................................ 387-5993
  Development Engineering ....................... 387-5993
  File Room ............................................. 387-5993
  Petroleum Geology Branch ................. 387-5993
  Drafting .............................................. 387-1908
  Petroleum Titles Branch ....................... 387-1908
  Drafting .............................................. 387-1908
  Offshore Coordinator .............................. 387-1908

FINANCE & ADMINISTRATION DIVISION

Assistant Deputy Minister ...................... 387-5135
  Finance & Resource Revenue Branch .... 387-6991
    Resource Revenue ................................ 387-6991
    Financial Services ................................ 387-5185
  Administration Branch ......................... 387-1368
    Publications Distribution ................... 387-3188
    Mail/Supply Room ................................ 387-6248
  Data Services Branch ......................... 387-1267
  Personnel Branch ................................. 387-3775

DISTRICT OFFICES

Fernie ......................................................... 423-6884
Fort St. John (Charlie Lake) .................. 787-3450
  Mediation & Arbitration Board ........... 787-3403
Kamloops ..................................................... 828-4566
Nanaimo ..................................................... 758-8971
Nelson ....................................................... 354-6125
Prince George ............................................. 565-6125
Quesnel ...................................................... 992-4222
Smithers ..................................................... 847-7383
Vancouver .....................................................
  Mineral Titles ......................................... 660-2672
  Inspection & Engineering ..................... 660-9363
  Geological Survey Branch ................. 660-2812

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